

1.0 OVERVIEW

1.1 Executive Summary

The Environmental Protection Agency (EPA), along with other federal agencies, is currently facing unprecedented challenges in trying to meet both internal and external stakeholders' increasing expectations for more efficient and effective stewardship of resources. The challenges associated with meeting stakeholder demands are augmented by a dynamic technical landscape, rapidly emerging technologies, and evolving independent, executive and legislative requirements.

The Administrative Systems Architecture (ASA) represents a significant initial step EPA is taking to improve its systems and ultimately the delivery of services to meet stakeholder expectations for more efficient, effective and results-based management in the Agency. This Baseline ASA report describes the current Administrative Systems environment. By documenting the current environment, including technical and functional data, this Baseline ASA provides the basis upon which to build the blueprint for its future administrative systems architecture.

To document the ASA, the ASA Work Group used a combination of the Federal Enterprise Architecture Framework (FEAF) and the Department of Defense's architecture framework for Command, Control, Communications, Computers, Intelligence, Surveillance, and Reconnaissance (C4ISR) work products, organizing mechanisms for managing the development and maintenance of architecture descriptions. The FEAF provides a framework to identify and define

the layers of EPA's current administrative architecture.

Following the FEAF and C4ISR, we defined the business architecture, data architecture, and applications architecture for the Administrative segment within EPA. Several techniques were used to collect the data that comprises the ASA, including detailed protocols and questionnaires to collect technical information, discussions and interviews with subject matter experts (SME) and business function managers, and facilitated work group sessions.

The data gathering exercise and subsequent structured analysis yielded valuable information to characterize the challenges confronting the Administrative Segment of the EPA Enterprise Architecture. Several overarching themes for administrative systems were drawn from an analysis of the functional and system findings. These themes include:

- Disparate Data Sources (Multiple Systems)
- Redundant Processing of data
- Limited System Interoperability
- Costly Maintainability of Systems

Several focused areas of opportunity for improvements in efficiency and elimination of redundant processing to improve data quality, streamline operations, and simplify maintenance became apparent through a simple analysis of the ASA. These include:

- Financial Information and Systems
- Acquisition Information and Systems

- Program Information
- Human Resources Information

1.2 Introduction

Enterprise Architecture

An enterprise architecture is a defined arrangement of the processes, data, applications, and technology that support an organization. It provides a holistic, or “enterprise,” view of Information Technology (IT) assets within the context of an organization's business. A baseline architecture defines the current “as is” arrangement, and the target architecture defines the future “to be” arrangement. The evolution from the current state to the future state is carried out according to a sequencing (transition) plan.

- Clinger-Cohen Act requires Agencies to maintain an Enterprise Architecture.
- CFO Act of 1990 requires the CFO to ensure that all organizational components of the agency apply sound financial management practices and use modern automated financial, mixed financial systems and tools
- Efficiency—simplify and unify to better serve the public and to save resources.
- Effectiveness—use of information to support cross-media trends analysis.

1.3 Background

The EPA Administrative Systems Architecture is a segment within the EPA Enterprise Architecture that is being developed by the Office of the Chief Financial Officer (OCFO) working in partnership with the Office of Environmental Information (OEI) and the Office of Administrative and Resources Management (OARM). Contract support for the work has

been provided through the IIASC contract with SRA International, Inc., supported by Soza & Company, Ltd., Systems Integration Group. Development of an ASA began in 1999 with a high-level analysis of existing administrative processes, the information they require and produce, and the major information systems that create or use administrative information.

During fiscal year 2001, the business, information systems, and data architecture baseline products completed during FY 1999 were updated. In Fiscal Year 2002, the emphasis of the ASA was changed to reflect a deeper examination of several of the more mission critical offices, systems, and associated data for Administrative systems and functions in the Agency. The Baseline ASA was updated and approval of functional managers was obtained. Additionally, detailed assessments of the Financial and Acquisition systems were performed, and the results of these assessments were integrated and incorporated into the ASA. This document represents the current (as-is) baseline for Administrative Systems.

1.4 ASA Organization

Enterprise Architecture efforts at EPA have been restructured to improve both performance and accountability. As illustrated in Figure 1-1, an Executive Steering Committee for the ASA has been established, and is supported by a Planning and a Work Group. The Executive Steering Committee reports directly to the Quality and Information Council (QIC) through the CIO and CFO. The Planning Group reports to the Executive Steering Committee, and is responsible for detailed planning and coordination of EA data collection and product development. The Work Group provides the functional and systems expertise

necessary to develop the EA, and their efforts are coordinated by the Planning Group. An EA Core Team has also been established to define Agency-wide standards for EA development and execution. The EA Core Team works with the Executive Steering Committee and Planning Group to ensure consistent product delivery.

1.5 Objectives and Scope

The objective of the Baseline ASA report is to document EPA's current administrative systems environment to inform the later development of a target administrative systems architecture and migration plan for implementing the target architecture. The focus of understanding whether current systems adequately meet EPA needs is driven from the perspective of the business

- Facility and Facility Related Services
- Information Management
- Contracts, Grants, and IAG Management

The analysis covers 69 significant systems owned by the various organizations that directly support administrative efforts and systems at the EPA, including: Office of the Chief Financial Officer, Office of Environmental Information, and Office of Administration and Resource Management, that support these business areas.

1.6 Methodology

The Federal Enterprise Architecture Framework, an organizing mechanism for managing the development and maintenance of architecture descriptions. Published in

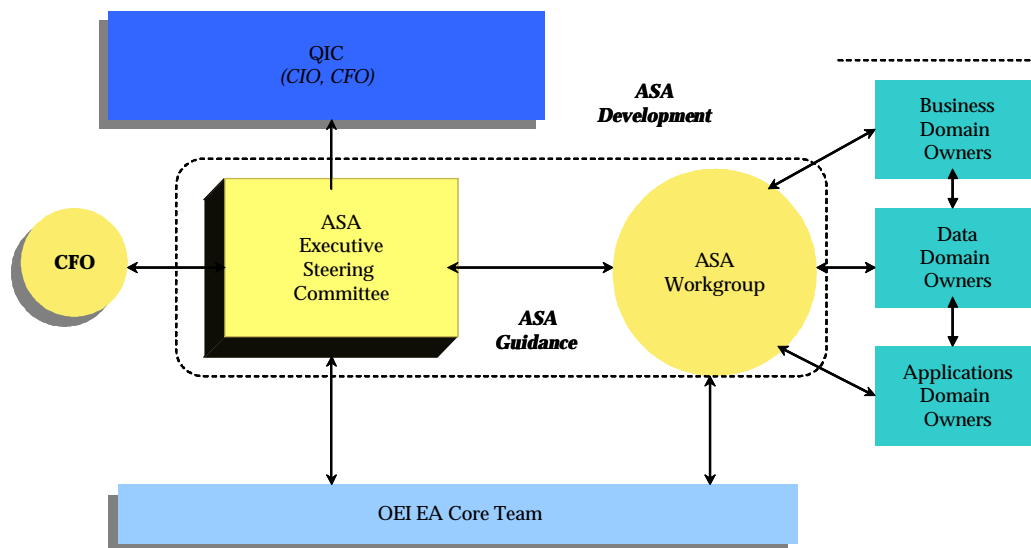


Figure 1-1. ASA Segment Governance Structure

or functions they are intended to enable. The administrative management areas within the scope of this effort include:

- Results Based Management/Financial
- Human Resource Management and Organization Services

1999 by the Federal Chief Information Officer (CIO) Council, the FEAF is an established framework used by agencies across the federal government. The CIO Council seeks to develop the Federal enterprise predicated upon the FEAF, however, other frameworks such as the

Treasury Enterprise Architecture Framework (TEAF) and Department of Defense (DoD) Command, Control, Communications, Computer, Intelligence, Surveillance and Reconnaissance (C4ISR) Architecture Framework are used by agencies as well. Following the FEAF and components of C4ISR, we worked with EPA to identify and define the business functions, data architecture, application architecture, and technology architecture for the administrative systems.

Information was collected using a variety of means, from the technical questionnaires and created products consistent with the FEAF methodology, to various models and products considered essential in C4ISR (see Section 2). These products served as the basis for identifying possible business and technical opportunities for improvement inherent in each of the administrative systems examined. Common themes, evident across systems and functions, were gleaned from the consolidated findings. This report describes the current state of the administrative systems architecture and

identifies opportunities for future improvement. By analyzing the data within this report, we have developed findings and recommendations to focus and guide the creation of a set of alternatives for the target administrative systems architecture that address current opportunities and meet the specific and unique needs of the EPA.

1.7 Content of the Report

This section generally describes the contents of EPA's baseline ASA, which is separated into five distinct, albeit interdependent, layers as depicted in Figure 1-2 below.

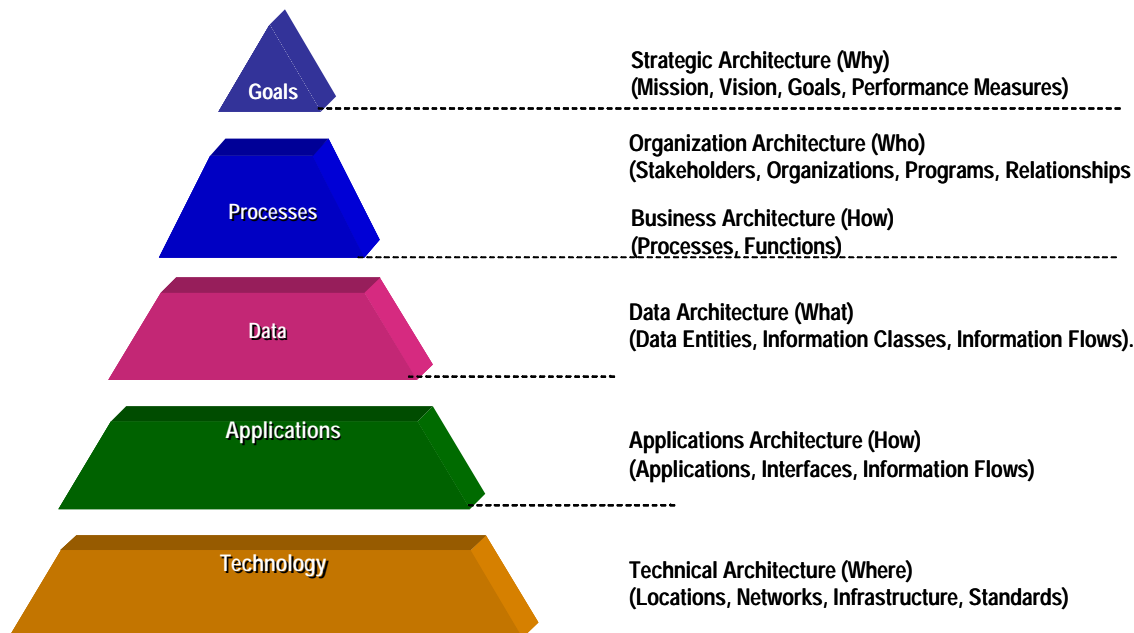


Figure 1-2. EPA EA Framework Model

Strategic Architecture—While the FEAF presents the Enterprise Architecture as four interdependent layers: business architecture, data architecture, applications architecture, and technology architecture, the EPA framework includes a fifth and highest layer to stress the importance of strategic architecture utilizing clearly stated goals, objectives, and performance measures to drive the Business Architecture.

Business Architecture—elaborates on the five major business functions that comprise the ASA by providing functional decomposition models and detailed definitions of each of the functions described in the models to:

- Provide Results Based Management
- Provide Human Resource Management and Organization Services
- Provide Facility and Facility Related Services
- Provide Information Management
- Provide Contracts, Grants, and IAG Management

Data Architecture—elaborates on the data that the Administrative Segment uses to perform administrative services as well as how that data relates to the functions and processes defined in the Business Architecture Layer. This section lists the 65 information objects that are used to support administrative services, as well as which processes create, read, update, or delete each information objects.

Applications Architecture—details the automated systems used by the EPA to perform administrative services, as well as the data that the applications process and share. This layer of the architecture also details the relationship between the 69

applications and the information objects involved with these applications. The application architecture also presents the interfaces between these 69 applications and the other systems within the ASA segment.

Technical Architecture—details the underlying technology infrastructure that supports the applications and data used by the EPA to perform financial management. This section merely references the EPA EA Technical Reference Model (Roadmap) to preclude redundant presentation of EA data.

1.8 Summary of Findings and Opportunities

1.8.1 Summary of Findings

The summaries of findings found in this section are derived from analysis of various ASA work products, including the CRUD matrix (appendix B), the Application/Information Class matrix (appendix C), and the Information Exchange matrix (appendix E). Section 2.9.3 of this document contains the detailed analysis related to the CRUD matrix, section 2.10.3 of this document contains the detailed analysis related to the Application/Information Class matrix, and section 2.10.6 contains the detailed analysis related to the Information Exchange matrix.

Basically, the analysis consists of counts of potentially redundant business processes and applications related to specific information classes. The higher the count, the more potentially problematic are the operations associated with the information class. High counts indicate redundant, non-standard processing that directly impacts interoperability. High counts identify opportunities for improvement.

For the purposes of this document, the analysis focuses on those information classes that are created by the greatest number of business processes, and those information classes that are created and stored in the greatest number of applications. Following are the summaries of findings for those information classes that represent clear opportunities for improvement.

1.8.1.1 Financial Systems

Interfaces between systems—Over half of the 100+ system interfaces that are documented as part of the ASA pass data either to or between applications supporting EPA financial operations.

Obligation & Commitment Information

- Obligation & Commitment Information is used to support 40 separate administrative business processes:
- 21 ASA business processes create Obligation & Commitment Information.
- 7 ASA Applications use the Obligation & Commitment Information Class.
- 5 ASA Applications create their own Obligation & Commitment Information.

These findings raise several questions concerning Obligation & Commitment Information:

- How are Acquisition Systems (IFMS, SPEDI, etc) using Obligation & Commitment Information?
- Is Obligation & Commitment Information consistent among non-interfaced ASA systems that use the same Obligation & Commitment Information?
- Are Financial and Acquisition Systems sharing Obligation & Commitment Information?

1.8.1.2 Program Activity Information

Program Activity Information is used to support 32 administrative business processes:

- 10 ASA business processes create Program Activity information
- 20 ASA Applications use the Program Information Class.
- 13 ASA Applications create and store Program Information.

These findings raise several questions concerning Program Activity information:

- How many different interfaces to the Program Offices must be maintained to supply 14 of the ASA applications with Program Information?
- Is Program Information being redundantly interfaced to separate ASA Applications?
- Is Program Information consistent among non-interfaced ASA systems that use the same Program Information?
- Is there an opportunity to centrally retrieve Program Information from the Program offices and store it inside of the ASA?

1.8.1.3 Human Asset Information

Human Asset Information Analysis

- 35 ASA Applications use the Human Asset Information.
- 25 ASA Applications create Human Asset Information.
- 17 ASA Applications receive Human Asset Information from HR-Pro, the central HR repository.
- 5 ASA Applications receive Human Asset Information from Notes NAB.

Table 1-1. ASA Applications that use Obligation & Commitment Information

Use Obligation & Commitment Information	Create Obligation & Commitment Information
BAS	BAS
CPS	CPS
FDW	IFMS
IFMS	SPITS
SCORPIOS	TM+
SPITS	
TM+	

- 3 ASA Applications receive Human Asset Information from Locator VB.
- 10 ASA Applications create their own Human Asset Information and do not interface with any other ASA Application.
- Human Asset Information is used in 55 Business Processes.

These findings raise several questions concerning Human Asset information:

- Is Human Asset Information being redundantly entered into separate ASA Applications?
- Is Human Asset Information consistent among the ASA systems that use the same Human Asset Information?
- Should the Locator VB, Notes NAB, and the 10 independent applications be interfaced with HR-Pro?
- Should the ability to create Human Asset Information be restricted in application besides HR-Pro?

1.8.1.4 Acquisition Systems

Acquisition/Assistance Information

- Acquisition/Assistance Information is used to support 34 ASA business processes.
- 14 ASA business processes create Acquisition/Assistance information.
- 18 ASA Applications use the Acquisition/Assistance Information Class.
- 6 ASA Applications create Acquisition/Assistance Information.
- 17 interfaces between ASA Applications share Acquisition/Assistance Information.
- 3 ASA Applications serve as Acquisition/Assistance Information hubs for other ASA Applications. The 3 ASA Application hubs do not share Acquisition/Assistance Information.
- FDW serves as a common repository for the 3 ASA Application hubs.

Table 1-2. ASA Applications that use Acquisition/Assistance Information

Use Acquisition/Assistance Information	Create Acquisition/Assistance Information	Acquisition/Assistance Information Hub Systems
ATGS	CDOTS	GICS
CDOTS	E-FORMS	ICMS
COGNOS	HR-Pro	SPEDI
CPS	ICMS	
E-FORMS	POI	
ENVIROFACTS	SPEDI	
FDW		
FEDBIZOPPS		
FPDS		
GICS		
HR-Pro		
ICMS		
IFMS		
IGMS		
PERS		
POI		
SPEDI		
TSSMS		

These finding raise several questions concerning Acquisition/Assistance Information:

- Is Acquisition/Assistance Information being redundantly interfaced to separate ASA Applications?
- Is Acquisition/Assistance Information consistent amongst non-interfaced ASA systems that use the same Acquisition/Assistance Information?
- Is there an opportunity to centrally store and retrieve Acquisition/Assistance Information by interfacing FDW?
- Does HR-Pro both create and store export Acquisition/Assistance Information?

1.8.1.5 Technology Infrastructure

Even with incomplete data, the ASA segment supports the following technology infrastructure at minimum:

- 8 different DBMS
- 5 different OS
- 11 different development environments

1.8.2 Major Themes and Opportunities

1.8.2.1 Major Themes

The following paragraphs detail those pervasive themes that cross the functional and technical findings for EPA's administrative business functions and their 69 major supporting systems. These overarching themes provide the context for developing the target administrative system architecture for EPA.

Disparate Data Sources. Users access data that resides on multiple systems for their day-to-day work. Users do not have a full understanding of the authoritative source of their data or how that data is manipulated by the systems they access. Key contributing factors include the lack of an administrative systems data dictionary, data redundancy across systems, and multiple business processes taking responsibility for creating data that exists in other applications. This problem is particularly acute with regard to Financial information, Acquisition Information, Personnel Information, and Program Information.

Redundant Processing of Data. When multiple business processes are creating and maintaining similar data in multiple applications, there is a high probability that much of this processing is redundant and wasteful of resources. In some cases,

despite the implementation of a system of record, redundant creation, storage, and processing of data continues in many applications.

Limited System Interoperability. Manual and automated interfaces provide for the sharing of data among administrative systems. As there is no overarching architecture or technology standard for system interfaces, each interface is designed, implemented, and supported differently—a significant change in one application, such as IFMS for example, might require modifying the code in up to 22 interfaces. The most significant contributing factor to the interoperability problem is the lack of documentation and enforcement of an enterprise data dictionary. Moreover, the high cost of maintaining over 100 non-standard separate existing interfaces, as well as the significant configuration management problems associated with such a complex environment, is a great impediment to change.

Costly Maintenance. Administrative systems use eight database management systems, five operating systems and over a dozen development environments over multiple geographical regions. This environment requires EPA to maintain a diverse and distributed technology skill set, as well as licensing agreements with multiple vendors. Multi-platform support also contributes to decreased system performance and interoperability, and an inherent difficulty introducing new technologies into the financial system environment.

1.8.2.2 Major Opportunities

Financial Systems. There appears to be significant opportunity for improvements in efficiency and interoperability, elimination of redundant processing, and reduction in

maintenance costs associated with those systems supporting financial operations at the EPA (See Section 3 below for details).

Personnel Information. While a system of record has been implemented (HR-Pro), elimination of redundant creation and processing of human resources information remains outstanding. Several systems continue to create and maintain human resource information independently of the current system of record, including directory services applications that implement network security.

Acquisition Systems. There appears to be significant opportunity for improvements in efficiency and interoperability, elimination of redundant processing, and reduction in cost associated with those systems supporting acquisition operations at the EPA (See Section 3 below for details).

Program Activity Information. There appears to be significant redundant storage and creation of Program Activity information in the various applications that comprise the ASA. No definitive source(s) of this information has been identified.

Technology Infrastructure. The cost of maintaining professional a staff capable of supporting six different DBMS, five different OS, and 11 different development environments is exorbitant. Significant efficiencies can be achieved through enforcement of technology standard and maintenance of common versions of software.